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A preliminary checklist of moths (Lepidoptera) from southern Rajasthan, India

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Abstract

Moths are non-papilionoid Lepidoptera and least studied than butterflies, likely due to mostly being nocturnal habit and cryptic colouration. A preliminary checklist of moth fauna from various southern Rajasthan is presented in the present study based on records from 1 January 2018 to 31 March 2020. We identified 154 moth species representing 10 super families, 18 families and 58 subfamilies. The most species rich families were Crambidae (n=46; 29.87%) Noctuidae (n=30; 19.48%) and Erebidae (n=29; 18.83%), and Geometridae (n=19; 12.34%). The significant outcome of this work is the report of 126 species for the first time from the state of Rajasthan.

Keywords: Diversity, India, Lepidoptera, Moths, Rajasthan

Introduction

Moths are non-papilionoid Lepidoptera and least studied than butterflies, likely due to mostly being nocturnal habit and cryptic colouration (Lees & Zilli, 2019). Around 1.42 million moth species identified worldwide make up 129 families. Of these, over 10,000 are known from India (Shubhalaxmi, 2018).

Rajasthan is the largest state of India, located in the west, and shared its international border with Pakistan and state boundary with Gujarat, Madhya Pradesh, Uttar Pradesh, Haryana, and Punjab states. The state has varying topographic features include the dry Thar Desert, plateaus, river beds, woodlands, wetlands and world's oldest Aravalli mountain range forms rocky terrain in many districts of the state. The southern part of the Rajasthan state holds much greener space than the rest of the state's area due to high rainfall and higher wetland density (Sharma *et al*., 2013). However, lots of works have been done to understand agriculture losses by some agricultural pest species in this taxa (Srivasthava & Bogawat, 1968; Kushwaha & Bhardwaj, 1977; Sharma *et al*., 2011; Babu & Meghwal, 2014; Haldhar *et al*., 2016; Meena *et al*., 2017) but very few studies are available on moths diversity and composition from the state (Gupta & Thakur, 1986; Sharma, 2011, 2014, 2016). To fill this lacuna, we present a preliminary checklist of moths from south Rajasthan in this paper recorded over the past two years.

Material and Methods

We compiled records of moths observed during various field visits in protected and non-protected areas of southern Rajasthan from 1 January 2018 to 31 March 2020 (Figure 1A). Most of the observations in residential houses and institutional buildings in and around Udaipur city were made unsystematic during the night under fluorescent lamps, incandescent bulbs and tube lights (Table 1). In addition, moths observed during the day were noted wherever possible. Opportunistic observations were also made from the districts of Dungarpur, Banswara, and Rajasmand, along with various field visits alongside Udaipur city. Individuals were photographed on-site and identified with standard references (Holloway, 2005; Gurule & Nikam, 2013; Sondhi & Sondhi, 2016; Singh *et al*., 2017) and field guides (Holloway *et al*., 2001; Kononenko & Pinratana, 2005, 2013; Kirti & Singh, 2015; Dey *et al*., 2018; Shubhalaxmi, 2018). The classification in this article follows Zahiri *et al*. (2011, 2012) and Nieukerken *et al*. (2011). Species are listed alphabetically with superfamily, family and subfamily in the Table 2. Species richness was represented as the percentage of each family and estimated as:

Species richness (%) = Number of species in a family/ Number of total species × 100

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Table 1. Detail of locations where observations were made in southern Rajasthan from 1 January 2018 to 31 March 2020

Sl. No.	Name of location	Habitat	Latitude	Longitude
1.	University quarters, Durga nursery road, Udaipur	Urban+Agriculture	24.5799	73.7093
2.	Science college campus, M L University, Udaipur	Urban	24.5933	73.7278
3.	Ganeshpura colony, Udaipur	Urban	24.5883	73.7238
4.	Residential colony, Sector 4, Udaipur	Urban	24.5634	73.7247
5.	SDM office, Rishabhdev, Udaipur	Rural	24.0705	73.6964
6.	Kumbhalgarh Wildlife Sanctuary, Rajasmand	Forest	25.045	73.432
7.	Badal Forest Rest House, Rajasmand	Forest	25.133	73.532
8.	Circuit House, Banswara	Urban	23.5593	74.4445

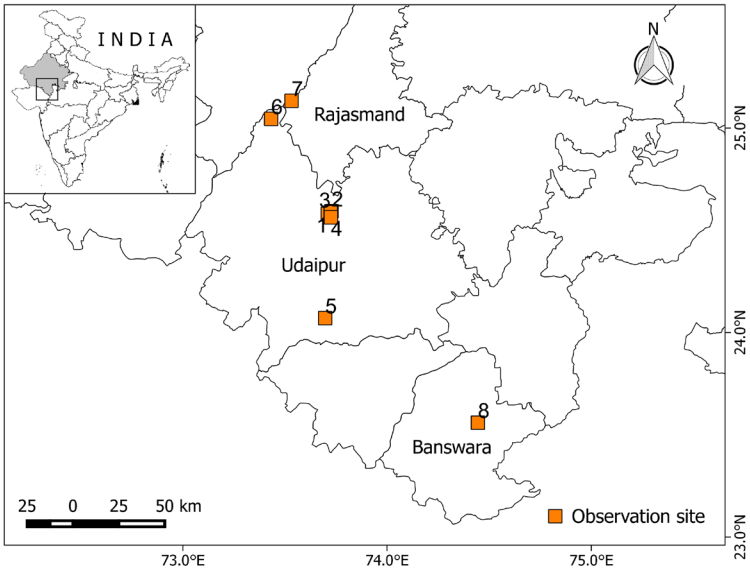


Figure 1A. Locations of sites where observations were made in southern Rajasthan, India. See Table 1 for list of localities.

Results

During the study, 154 species of moths were identified representing 10 superfamilies, 18 families and 58 subfamilies (Figures 1B-154; Table 2). The highest number belonged to Noctuoidea (n=55; 35.71%) and Pyraloidea (n=49; 31.81%) super families. Although in families the highest records were found in Crambidae (n=46; 29.87%) followed by Noctuidae (n=30; 19.48%), Erebidae (n=29; 18.83%), and Geometridae (n=19; 12.34%) families, respectively (Figure 155).

Table 2. A preliminary checklist of moths recorded from southern Rajasthan, India. Time of observation presented as Year (months) from 1 January to 31 March 2020. Check observation locations details in Table 1. (*First record from Rajasthan state)

Sl. No.	Super-family	Family	Sub-family	Scientific name	Year (month) of observation	Location of observation
1.	Tineoidae	Tineidae	Tineinae	*Monopis pavlovskii* Zagulajev, 1955*	2018 (11), 2019 (11)	1
2.	Yponomeuto-idea	Plutellidae	Plutellinae	*Plutella xylostella* Linnaeus, 1758	2018(3,4), 2019(3)	1,2,3
3.		Attevidae	Attevinae	*Atteva fabriciella* Swedrus, 1787*	2018(8-10). 2019(9,10)	1,2,3
4.	Gelechioidea	Lecithoceri-dae	Lecithocerinae	*Homaloxestis myeloxesta* Meyrick, 1932*	2018(8,9), 2019(8)	1,3
5.		Stathmopo-didae	Stathmopo-dinae	*Stathmopoda auriferella* Walker, 1864*	2019(10)	1
6.	Tortricoidea	Tortricidae	Olethreutinae	*Loboschiza koenigiana* Fabricius, 1775*	2018(10), 2019(8-12), 2020(1,2)	1,2,8
7.				*Olethreutes permundana* Clemens, 1860*	2018(3,4),2019 (10)	1
8.	Thyridoidea	Thyrididae	Strigliniinae	*Banisia myrsusalis* Walker, 1859*	2019(9)	2
9.	Hyblaeidea	Hyblaeidae	Herminiinae	*Hyblaea puera* Cramer, 1777*	2018(10)	1
10.	Pyraloidea	Pyralidae	Pyralinae	*Pyralis pictalis* Curtis, 1834*	2018(8,9,10)	2
11.			Galleriinae	*Aphomia zelle ride* Joannis, 1932*	2018(10)	1
12.			Endotrichinae	*Endotricha repandalis* Fabricius, 1794*	2019(12)	2
13.		Crambidae	Acentropinae	*Parapoynx diminuta lis* Snellen, 1880*	2018(8), 2019(9)	1,2
14.				*Parapoynx offinialis* Guenée, 1854*	2019(9)	2
15.				*Parapoynx bilinealis* Snellen, 1876*	2018(10), 2019(10)	1
16.				*Eoophyla peribocalis* Walker, 1859*	2019(9)	2
17.				*Elophila obliteralis* Walker, 1859*	2019(9)	2
18.			Crambinae	*Crocidolomia binotalis* Zeller, 1852	2019(9)	2
19.			Cybalomiinae	*Ptychopseustis plumbeolinealis* Hamp-son, 1896*	2018(10), 2019(10)	1,2
20.			Noordinae	*Noorda blitealis* Walker, 1859	2018(8)	2
21.			Odontiinae	*Autocharis subricostalis* Hampson, 1910*	2018(8), 2019(7)	1,2,3
22.			Pyraustinae	*Achyra coelatalis* Walker, 1859*	2019(9,10)	2
23.				*Diasemia accalis* Walker, 1859*	2019(9)	2
24.				*Isocentris filalis* Guenée, 1854*	2019(9)	2
25.				*Leucinodes orbonalis* Guenée, 1854	2019(8)	2
26.				*Maruca vitrata* Fabricius, 1787*	2019(8)	2
27.				*Nausinoe geometralis* Guenée, 1854*	2018(7,8), 2019(9)	1,2
28.				*Orphanostigma abruptalis* Walker, 1859*	2019(10)	2

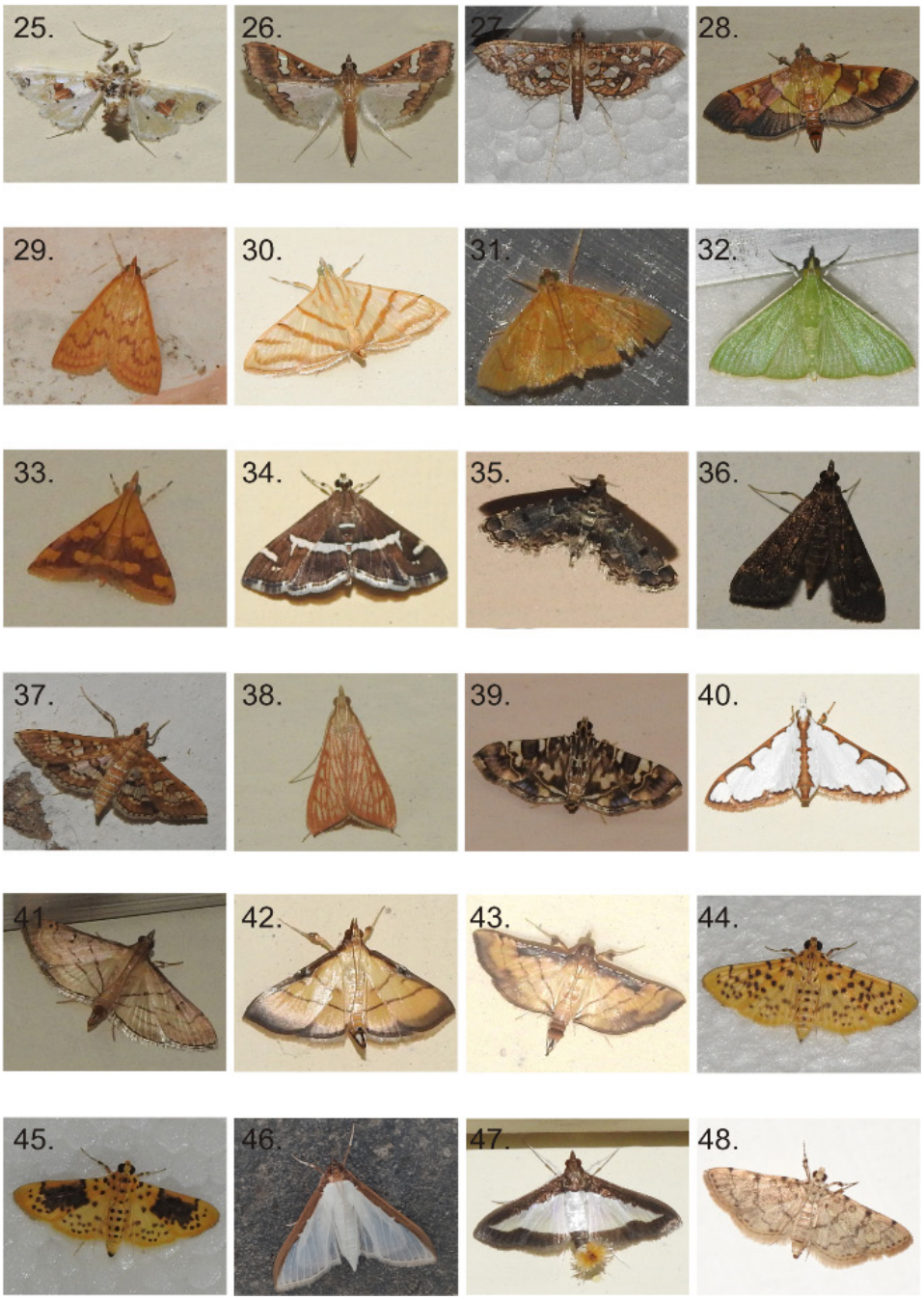
Sl. No.	Super-family	Family	Sub-family	Scientific name	Year (month) of observation	Location of observation
29.				*Ostrinia nubilalis* Hübner, 1796*	2019(10)	1,2
30.				*Pagyda salvalis* Walker, 1859*	2019(9)	1,2
31.				*Paligaochrealis* Moore, 1886*	2019(9)	2
32.				*Parotis pomonalis* Guenée, 1854*	2019(9)	2
33.				*Pyrausta panopealis* Walker, 1859*	2019(10)	1,2
34.				*Spoladea recurvalis* Fabricius, 1775	2018(7-11), 2019(6-10),2020(1,2)	1,2,3,5,7,8,9
35.				*Sufetuladi minutalis* Walker, 1866*	2018(10)	1
36.				*Symmoracma minoralis* Snellen, 1880*	2019(11)	2
37.			Saneodes	*Sameodes cancellalis* Zeller, 1852*	2018(7-11), 2019(7-11)	1,2,7,9
38.			Spilomelinae	*Antigastra catalaunalis* Duponchel, 1833*	2018(9), 2019(7-9)	1,2
39.				*Chabula acamasalis* Walker, 1859*	2018(9), 2019(7)	1,2
40.				*Cirrhochrista brizoalis* Walker, 1859*	2019(9)	2
41.				*Cnaphalocrocis cochrusalis* Walker, 1859*	2019(8)	2
42.				*Cnaphalocrocis medinalis* Guenée, 1854*	2019(8)	2
43.				*Cnaphalocrocis poeyalis* Boisduval, 1833*	2019(8)	2
44.				*Conogethes punctiferalis* Guenée, 1854*	2019(8)	2
45.				*Conogethes semifascialis* Walker, 1866*	2019(8)	2
46.				*Cydalima laticostalis* Guenée, 1854*	2019(12)	2
47.				*Diaphania indica* Saunders, 1851	2018(9), 2019(7-9)	1,2
48.				*Haritalodes derogata* Fabricius, 1775*	2018(8)	1,2
49.				*Herpetogramma bipunctalis* Fabricius, 1794*	2019(10)	2
50.				*Herpetogramma licarsisalis* Walker, 1859*	2019(8)	1,2
51.				*Hodebertia testalis* Fabricius, 1794*	2019(12)	2
52.				*Hydriris ornatalis* Duponchel, 1832*	2018(8-10), 2019(8-10)	1,2,3
53.				*Piletocerachyrsorycta* Meyrick, 1884*	2019(9)	1,2
54.				*Poliobotys ablactalis* Walker, 1859*	2019(11)	2
55.				*Rehimena phrynealis* Walker, 1859*	2018(8), 2019(7,8)	1,2
56.				*Syncleratraducalis* Zeller, 1852*	2019(8)	2
57.				*Syngamia latimarginalis* Walker, 1859*	2019(9)	2

Sl. No.	Super-family	Family	Sub-family	Scientific name	Year (month) of observation	Location of observation
58.				*Tatobotys biannulalis* Walker, 1866*	2019(9)	2
59.	Bombycoidea	Bombycidae	Eupterotidae	*Eupterote mollifera* Walker, 1865*	2019(7,9)	2
60.			Bombycidae	*Trilocha varians* Walker, 1855*	2018(8)	2
61.		Saturniidae	Saturniinae	*Antheraea mylitta* Drury, 1773*	2018(2), 2019(9)	2,5
62.		Sphingidae	Macroglossinae	*Daphnis nerii* Linnaeus, 1758*	2018(11), 2019(10)	1,2,3
63.				*Hippotion boerhaviae* Fabricius, 1775	2019(8)	2
64.				*Hippotion celerio* Linnaeus, 1758	2019(4)	2
65.				*Macroglossum stellatarum* Linnaeus, 1758*	2019(7)	1
66.				*Nephele hespera* Fabricius, 1775*	2019(10)	2
67.				*Theretra alecto* Linnaeus, 1758*	2019(9)	1,2
68.			Smerinthinae	*Polyptychus dentatus* Cramer, 1777*	2019(9)	1
69.			Sphinginae	*Acherontia styx* Westwood, 1844	2018(9)	1
70.				*Acherontia lachesis* Fabricius, 1798*	2019(9)	2
71.	Geometroidea	Geometridae	Ennominae	*Biston suppressaria* Guenée, 1857*	2018(7,8)	2
72.				*Chiasmia hebesata* Walker, 1861*	2018(9)	2
73.				*Cleora alienaria* Walker, 1860*	2019(8)	2
74.				*Isturgia disputaria* Guenée, 1858*	2019(9)	2
75.			Geometridae	*Comibaena cassidara* Guenée, 1857*	2019(9)	1,2,3
76.				*Hemithea aestivaria* Hübner, 1799*	2019(10)	2
77.				*Hyposidra talaca* Walker, 1860*	2019(3)	2
78.				*Microloxia indecretata* Walker, 1863*	2019(10)	2
79.				*Pelagodes anti quadraria* Inoue, 1976*	2019(10)	2,3
80.				*Pelagodes falsaria* Prout, 1912*	2019(8)	2
81.				*Thalassodes quadraria* Guenée, 1857*	2018(10)	1,2
82.			Larentiiae	*Pasiphila rectangulata* Linnaeus, 1758*	2018(8)	2
83.			Sterrhinae	*Chrysocraspeda faganaria* Guenée, 1858*	2019(9)	2
84.				*Chrysocraspeda olearia* Guenée, 1857*	2019(9)	2
85.				*Idaea macrospila* Prout, 1926*	2019(10)	2
86.				*Scopula addictaria* Walker, 1861*	2019(9)	2
87.				*Scopula minorata* Boisduval, 1833*	2019(3,4)	2
88.				*Scopula subpunctaria* Herrich-Schaffer, 1847*	2019(8)	2
89.				*Traminda mundissima* Walker, 1861*	2018(7,8), 2019(8,9)	1,2,3,7
90.		Uraniidae	Microninae	*Acropteris ciniferaria* Walker, 1866*	2018(8)	5
91.	Noctuoidea	Erebidae	Aganainae	*Asota caricae* Fabricius, 1775*	2019(2)	9

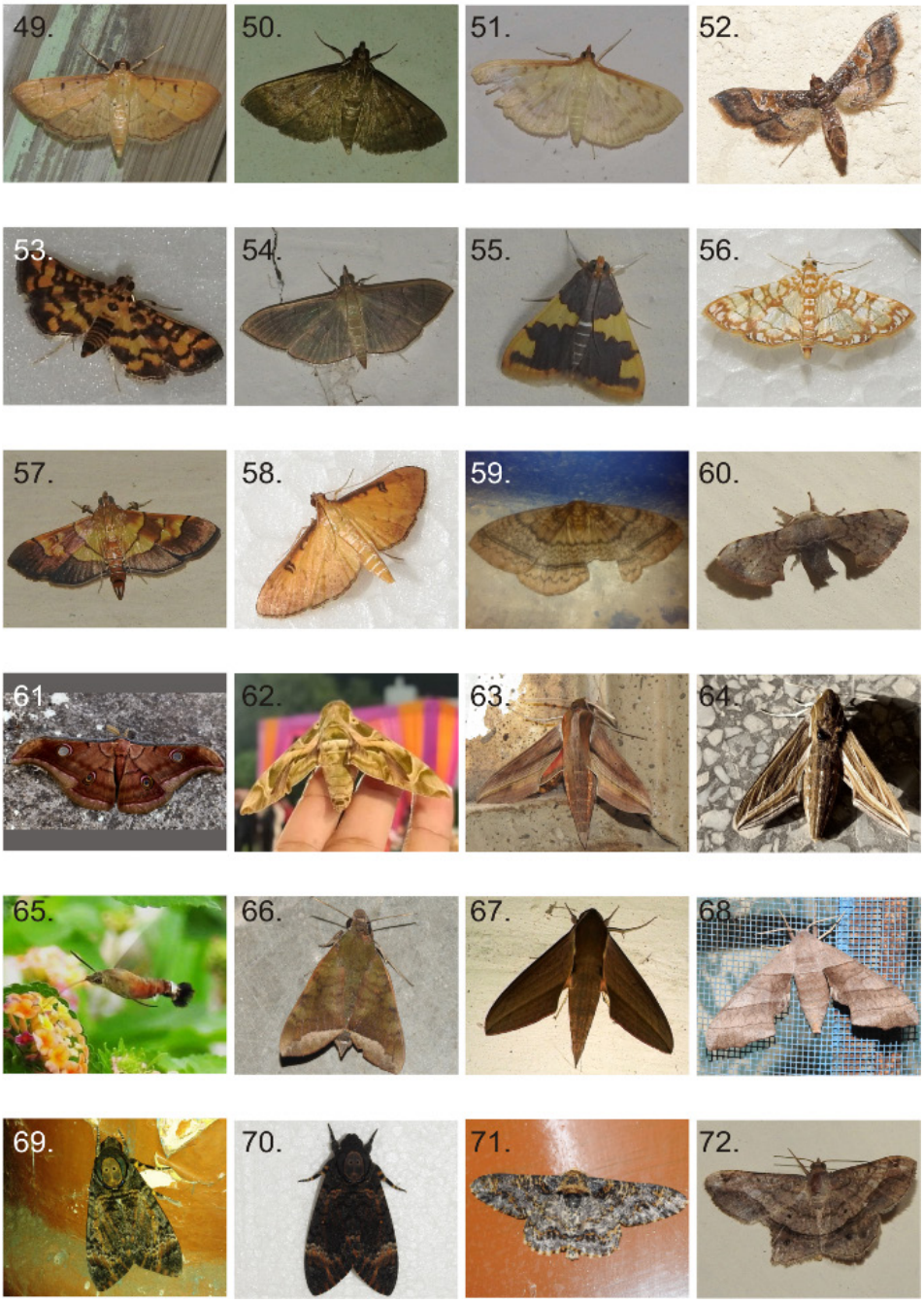
Sl. No.	Super-family	Family	Sub-family	Scientific name	Year (month) of observation	Location of observation
92.			Arctiinae	*Alo amarginata* Donovan, 1805*	2018(11)	2
93.				*Amata cyssea* Stoll, 1782*	2018(1-4), 2019(8,12)	1,2,3,4,8
94.				*Amata passalis* Fabricius, 1781*	2019(10)	2
95.				*Amerila astreus* Drury, 1773*	2018(9)	3
96.				*Creatonotos gangis* Linnaeus, 1763	2019(8)	1,2,3,7
97.				*Cyana puella* Drury, 1773*	2019(4)	7
98.				*Olepa ricini* Fabricius, 1775*	2019(8)	1,2
99.				*Syntomoides imaon* Cramer, 1779*	2019(2,3,10)	1
100.			Boletobiinae	*Eublemma baccalix* Swinhoe, 1886*	2019(10)	1
101.			Calpinae	*Eudocima maternam* Linnaeus, 1767*	2018(1,8,9), 2019(8,9)	1,2,3,4
102.				*Oraesia emarginata* Fabricius, 1794*	2019(9)	2
103.			Catocalinae	*Acantholipes trajecta* Walker, 1865*	2019(11)	1
104.			Erebinae	*Bastilla crameri* Moore, 1885*	2018(2)	8
105.				*Erebus macrops* Linnaeus, 1770*	2019(10)	1
106.				*Mocis frugalis* Fabricius, 1775*	2018(8)	1,2,3
107.				*Spirama helicina* Hübner, 1827*	2018(10)	1
108.				*Trigonodes hyppasia* Cramer, 1779*	2018(4)	2
109.			Eublemminae	*Eublemma roseonivea* Walker, 1863*	2019(9)	2
110.				*Eublemma anachoresis* Wallengren, 1863*	2019(10)	1,2
111.			Herminiinae	*Hydrillodes metisalis* Walker, 1859*	2019(10)	1
112.			Hypeninae	*Hypena laceratalis* Walker, 1859*	2018(10)	1
113.				*Hypena obacerralis* Walker, 1859*	2019(10)	1
114.			Hypocalinae	*Hypocala deflorata* Fabricius, 1794*	2018(10)	2
115.			Lymantriinae	*Euproctis similis* Fuessly, 1775*	2018(4,8)	1,2,3
116.				*Lymantria incerta* Walker, 1855*	2018(10)	2
117.				*Orvasca subnotata* Walker, 1865*	2018(11)	1,2
118.				*Somena scintillans* Walker, 1856	2018(8)	1
119.			Scolioptery-ginae	*Anomis flava* Fabricius, 1775	2019(11)	2
120.		Noctuidae	Acontiinae	*Acontia crocata* Guenée, 1852*	2019(10)	2
121.				*Amyna axis* Guenée, 1852*	2019(9)	2
122.			Agaristinae	*Aegocera venulia* Cramer, 1777	2018(9)	3
123.			Careini	*Carea subtilis* Walker, 1858*	2019(10)	2
124.			Condicinae	*Condica illecta* Walker, 1865*	2019(8)	2
125.			Eulepidotinae	*Anticarsia irrorata* Fabricius, 1781	2018(9)	2
126.			Eustrotiinae	*Maliattha signifera* Walker, 1857*	2019(8)	2
127.				*Maliattha quadripartite* Walker, 1865*	2019(9)	2

Sl. No.	Super-family	Family	Sub-family	Scientific name	Year (month) of observation	Location of observation
128.				*Ozarba aeria* Grote, 1881*	2019(10)	2
129.			Hadeninae	*Anarta trifolia* Hufnagel, 1766*	2018(2)	8
130.				*Mythimna separata* Walker, 1865	2018(3)	1
131.			Heliothinae	*Adisura atkinsoni* Moore, 1881	2019(10)	1
132.				*Helicoverpa armigera* Hübner, 1808	2018(3), 2019(4,10)	1,2,3
133.				*Helicoverpa assulta* Guenée, 1852	2019(10)	1
134.				*Helicoverpa zea* Boddie, 1850*	2018(2)	8
135.			Herminiinae	*Hipoepa fractalis* Guenée, 1854*	2019(12)	2
136.			Lymantriinae	*Olene mendosa* Hübner, 1823	2019(9)	2
137.			Noctuinae	*Acanthodelta janata* Linnaeus, 1758*	2018(8), 2019(7-9)	1,2
138.				*Aedia acronyctoides* Guenée, 1852*	2019(9)	2
139.				*Aedia leucomelas* Linnaeus, 1758*	2019(8)	2
140.				*Agrotis spinifera* Hübner, 1808	2018(3)	1
141.				*Polytela gloriosae* Fabricius, 1781*	2018(7-9)	1
142.				*Spodoptera exigua* Hübner, 1808	2018(11)	1
143.				*Spodoptera mauritia* Boisduval, 1833	2018(11)	1,7
144.				*Spodoptera litura* Fabricius, 1775	2019(8,10)	2
145.			Plusiinae	*Chrysodeixis acuta* Walker, 1857*	2018(9)	1
146.				*Chrysodeixis eriosoma* Doubleday, 1843*	2018(1)	1
147.				*Thysanoplusia daubei* Boisduval, 1840*	2019(10)	2
148.				*Thysanoplusia orichalcea* Fabricius, 1775	2020(2)	1
149.				*Trichoplusia ni* Hübner, 1803	2018(8)	2
150.		Nolidae	Chloephorinae	*Xanthodes albago* Fabricius, 1794	2019(9)	2
151.			Eariadinae	*Earias cupreoviridis* Walker, 1862*	2019(9)	2
152.			Eligminae	*Selepa celtis* Moore, 1858	2018(9)	2
153.			Nolinae	*Nola analis* Wileman and West, 1928*	2019(10)	1,2
154.				*Nola taeniata* Snellen, 1875*	2019(10)	1

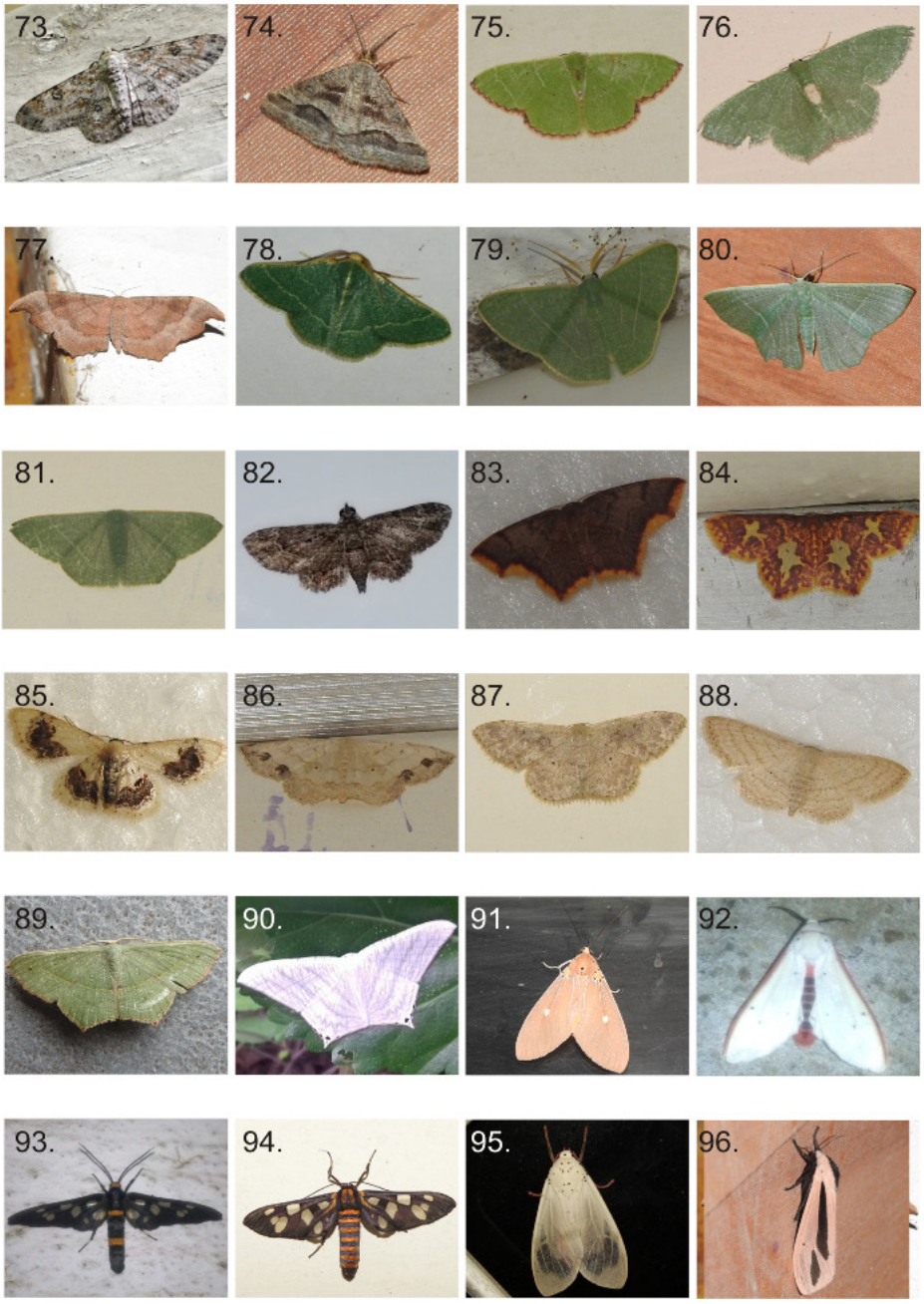
Figures 1A-24. Photographs of moths recorded in southern Rajasthan, India, from 1 January 2018 to 31 March 2020. **1A.** *Monopis pavlovskii*, **2.** *Plutella xylostella,* **3.** *Atteva fabriciella*, **4.** *Homaloxestis myeloxesta*, **5.** *Stathmopoda auriferella*, **6.** *Loboschiza koenigiana*, **7.** *Olethreutes permundana*, **8.** *Banisia myrsusalis*, **9.** *Hyblaea puera*, **10.** *Pyralis pictalis*, **11.** *Aphomia zelle ride*, **12.** *Endotricha repandalis*, **13.** *Parapoynx diminuta lis*, **14.** *Parapoynx affinialis*, **15.** *Parapoynx bilinealis*, **16.** *Eoophyla peribocalis*, **17.** *Elophila obliteralis*, **18.** *Crocidolomia binotalis*, **19.** *Ptychopseustis plumbeolinealis*, **20.** *Noorda blitealis*, **21.** *Autocharis subricostalis*, **22.** *Achyra coelatalis*, **23.** *Diasemia accalis*, and **24.** *Isocentris filalis.*



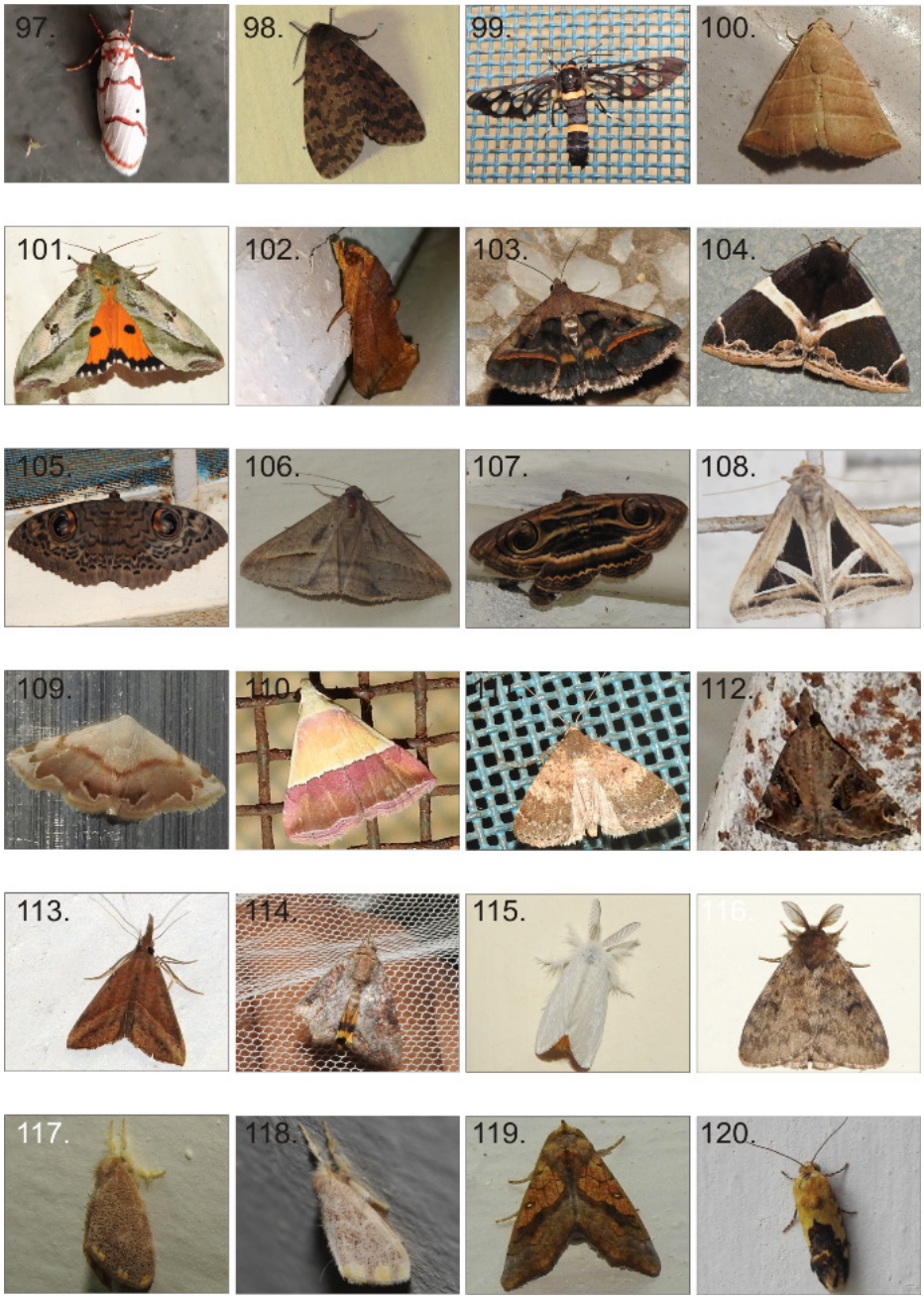
Figures 25-48. Photographs of moths recorded in southern Rajasthan, India, from 1 January 2018 to 31 March 2020. **25.** *Leucinodes orbonalis*, **26.** *Maruca vitrata,* **27.** *Nausinoe geometralis*, **28.** *Orphanostigma abruptalis*, **29.** *Ostrinia nubilalis*, **30.** *Pagyda salvalis*, **31.** *Paligaochrealis*, **32.** *Parotis pomonalis*, **33.** *Pyrausta panopealis*, **34.** *Spoladea recurvalis*, **35.** *Sufetuladi minutalis*, **36.** *Symmoracma minoralis*, **37.** *Sameodes cancellalis*, **38.** *Antigastra catalaunalis*, **39.** *Chabula acamasalis*, **40.** *Cirrhochrista brizoalis*, **41.** *Cnaphalocrocis cochrusalis*, **42.** *Cnaphalocrocis medinalis*, **43.** *Cnaphalocrocis poeyalis*, **44.** *Conogethes punctiferalis*, **45.** *Conogethes semifascialis*, **46.** *Cydalima laticostalis*, **47.** *Diaphania indica*, and **48.** *Haritalodes derogata.*



Figures 49-72. Photographs of moths recorded in southern Rajasthan, India, from 1 January 2018 to 31 March 2020. **49.** *Herpetogramma bipunctalis*, **50.** *Herpetogramma licarsisalis,* **51.** *Hodebertia testalis*, **52.** *Hydriris ornatalis*, **53.** *Piletocerachyrsorycta*, **54.** *Poliobotys ablactalis*, **55.** *Rehimena phrynealis*, **56.** *Syncleratraducalis*, **57.** *Syngamia latimarginalis*, **58.** *Tatobotys biannulalis*, **59.** *Eupterote mollifera*, **60.** *Trilocha varians*, **61.** *Antheraea mylitta*, **62.** *Daphnis nerii*, **63.** *Hippotion boerhaviae*, **64.** *Hippotion celerio*, **65.** *Macroglossum stellatarum*, **66.** *Nephele hespera*, **67.** *Theretra alecto*, **68.** *Polyptychus dentatus*, **69.** *Acherontia styx*, **70.** *Acherontia lachesis*, **71.** *Biston suppressaria*, and **72.** *Chiasmia hebesata.*

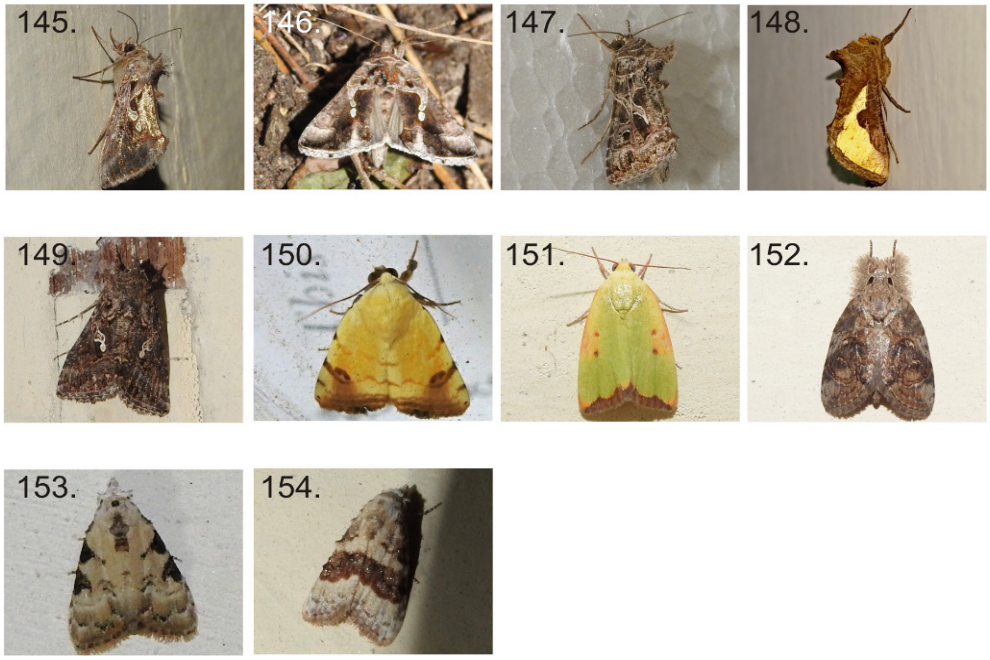


Figures 73-96. Photographs of moths recorded in southern Rajasthan, India, from 1 January 2018 to 31 March 2020. **73.** *Cleora alienaria*, **74.** *Isturgia disputaria,* **75.** *Comibaena cassidara*, **76.** *Hemithea aestivaria*, **77.** *Hyposidra talaca*, **78.** *Microloxia indecretata*, **79.** *Pelagodes anti quadraria*, **80.** *Pelagodes falsaria*, **81.** *Thalassodes quadraria*, **82.** *Pasiphila rectangulata*, **83.** *Chrysocraspeda faganaria*, **84.** *Chrysocraspeda olearia*, **85.** *Idaea macrospila*, **86.** *Scopula addictaria*, **87.** *Scopula minorata*, **88.** *Scopula subpunctaria*, **89.** *Traminda mundissima*, **90.** *Acropteris ciniferaria*, **91.** *Asota caricae*, **92.** *Aloa marginata*, **93.** *Amata cyssea*, **94.** *Amata passalis*, **95.** *Amerila astreus*, and **96.** *Creatonotos gangis.*



Figures 97-120. Photographs of moths recorded in southern Rajasthan, India, from 1 January 2018 to 31 March 2020. **97**. *Cyana puella*, **98**. *Olepa ricini,* **99**. *Syntomoides imaon*, **100**. *Eublemma baccalix*, **101**. *Eudocima maternam*, **102**. *Oraesia emarginata*, **103**. *Acantholipes trajecta*, **104**. *Bastilla crameri*, **105**. *Erebus macrops*, **106**. *Mocis frugalis*, **107**. *Spirama helicina*, **108**. *Trigonodes hyppasia*, **109**. *Eublemma roseonivea*, **110**. *Eublemma anachoresis*, **111**. *Hydrillodes metisalis*, **112**. *Hypena laceratalis*, **113**. *Hypena obacerralis*, **114**. *Hypocala deflorata*, **115**. *Euproctis similis*, **116**. *Lymantria incerta*, **117**. *Orvasca subnotata*, **118**. *Somena scintillans*, **119**. *Anomis flava*, and **120**. *Acontia crocata.*

Figures 121-144. Photographs of moths recorded in southern Rajasthan, India, from 1 January 2018 to 31 March 2020. **121**. *Amyna axis*, **122**. *Aegocera venulia*,**123**. *Carea subtilis*, **124**. *Condica illecta*, **125**. *Anticarsia irrorata*, **126**. *Maliattha signifera*, **127**. *Maliattha quadripartite*, **128**. *Ozarba aeria*, **129**. *Anarta trifolia*, **130**. *Mythimna separata*, **131**. *Adisura atkinsoni*, **132**. *Helicoverpa armigera*, **133**. *Helicoverpaassulta*, **134**. *Helicoverpa zea*, **135**. *Hipoepa fractalis*, **136**.*Olene mendosa*, **137**. *Acanthodelta janata*, **138**. *Aedia acronyctoides*, **139**. *Aedia leucomelas*, **140**. *Agrotis spinifera*, **141**. *Polytela gloriosae*, **142**. *Spodoptera exigua*, **143**. *Spodoptera mauritia*, and **144**. *Spodoptera litura.*



Figures 145-154. Photographs of moths recorded in southern Rajasthan, India, from 1 January 2018 to 31 March 2020. **145**. *Chrysodeixis acuta*, **146**. *Chrysodeixis eriosoma,* **147**. *Thysanoplusia daubei*, **148**. *Thysanoplusia orichalcea*, **149**. *Trichoplusia ni*, **150**. *Xanthodes albago*, **151**. *Earias cupreoviridis*, **152**. *Selepa celtis*, **153**. *Nola analis*, **154**. *Nola taeniata*.

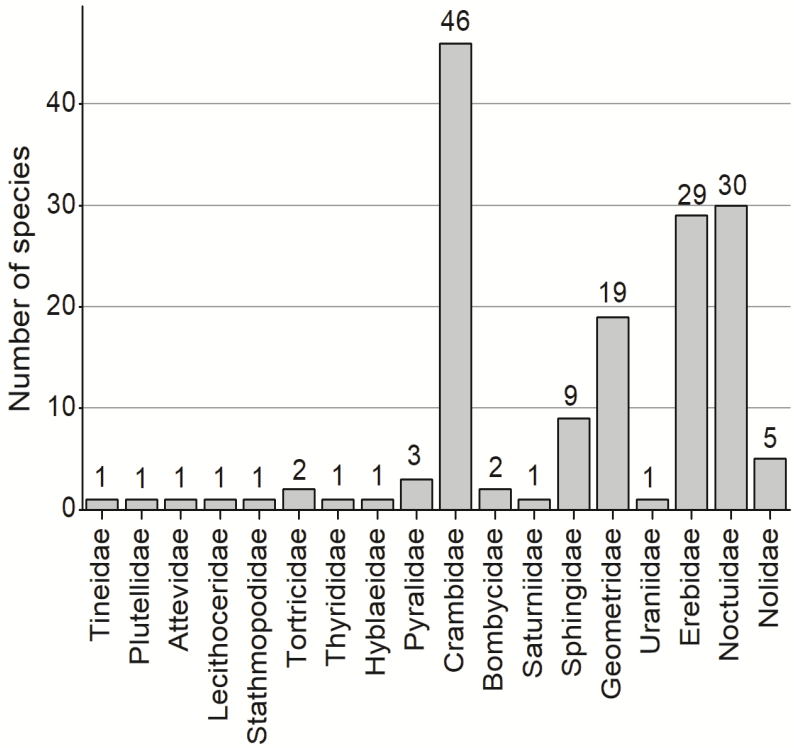


Figure 155. Number of moth species recorded in different families in southern Rajasthan, India, from 1 January 2018 to 31 March 2020.

Discussion

This preliminary study represents a high diversity of moths in southern Rajasthan. Previously, Gupta & Thakur (1986) reported nine species of moths from six districts (Alwar, Bharatpur, Chittorgarh, Durgapur, Jhunjhunu, Jodhpur and Pali), Sharma (2011) reported 38 species of moths associated with vegetables in the Aravali range, while Sharma (2014) observed 56 species at foothills of Aravalli range, while Sharma (2016) reported 56 species from the Ajmer district of Rajasthan. As the present work is the first comprehensive study of moths focusing on overall diversity in the southern part of the state, the key outcome of this work is the reporting of 126 species among 154 species for the first time in three districts as well as in the state of Rajasthan (Table 1).

More detailed faunistic surveys are required in the various ecological regions of the state to compile the complete list of moth fauna. It will also help to understand that how this fauna changes its composition in different regions. The present study will provide a baseline for other studies in this region, and new species and genus records will enable agriculture scientists in this region to make suitable pest control measures for crops in this area.

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